A Study of Digital Transformation of MSMEs and Measures for Dealing with Emerging Risks – with a Special Reference to Agra MSME Sector

Synopsis

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1.0 Introduction

In India the *"Micro, Small, and Medium Enterprises (MSMEs)"* sector is the second-largest job creator (*Financial Express,2020*). The sector plays a key role as it generates employment for the masses. This sector operates at lower capital cost, also has contributed significantly to the reduction of regional imbalances and the promotion of industrialization in rural and remote areas. This sector like many other sectors in India is undergoing transformation as a result of adoption of cutting-age technologies such as AI, data analytics, ML. The transformation includes newer business models such as aggregator models that connect creditors, borrowers, and enablers etc. MSMEs can simplify and automate their operations, and hence increase productivity using these cutting-edge technologies. (*IBEF,2021*).

The recent COVID-19 pandemic has accelerated the adoption of technologies and innovation in businesses for their growth and survival. The transformation can be seen at all levels and processes like social relations, marketing and sale, etc. (*Fernando, José & José, 2020*). Businesses should be proactive and prepared to deal with the change, and to do so, they need to promote an innovation culture within organization.

250 small business owners were polled by Dun & Bradstreet in the fourth quarter of 2020 to find out how COVID-19 was affecting their daily operations. By digitising routine tasks, 54% of those surveyed claimed to have cut operating expenses, and 51% claimed that doing so had enhanced their competitive positioning. Businesses those who are early adopters of technologies will be better prepared to take advantage on Indian market. (*Kaka et. al, 2019*).

MSME sector is a critical sector as it is significant contributor i.e., 30% of India's GDP, 48% of annual exports, and is also a second largest employer *(IBEF, 2021).* Introduction of competitive services, distribution through multiple channels, the active involvement of stakeholders demands MSMEs to have good oversight and management of their operations while ensuring the quality and in-time delivery of goods to avoid any setbacks. Tech-based solutions have great potential to address MSME business's needs. With more and more digital adoption, SMEs would be able to contribute approx. between INR 15.8 and INR 21.6 crores to India's GDP by 2024. *(CISCO, 2020).*

1.1 MSME Landscape in India

There are approx. 6.3 crores MSMEs across India which generates approx. 11 crore jobs, which

amounts to 22% of total jobs in the country as per 73rd National Sample Survey. The largest contributors are Uttar Pradesh and West Bengal. *(IBEF, 2021)*. As stated in MSMSE's 2020-2021 annual report, MSMEs are evenly distributed between rural and urban areas. 36% of MSMEs that operate in the Trade sector Urban areas are major contributors to this sector, followed by Other Services (33%), and rural areas major contributors in manufacturing activity leading to Manufacturing (31%) (*MSMSE Annual Report, 2020-21*).

Revised Classification applicable w.e.f 1st July 2020			
Composite Criteria: Investment in Plant & Machinery/equipment and Annual Turnover			
Classification	**Micro**	**Small**	**Medium**
Manufacturing Enterprises and Enterprises rendering Services	Investment in Plant and Machinery or Equipment: Not more than Rs. 1 crore and Annual Turnover; not more than Rs. 5 crore.	Investment in Plant and Machinery or Equipment: Not more than Rs. 10 crore and Annual Turnover; not more than Rs. 50 crore.	Investment in Plant and Machinery or Equipment: Not more than Rs. 50 crore and Annual Turnover; not more than Rs. 250 crore.

Figure 1: Classification of MSME – definitions
(Source: Govt. of India website for MSMEs, 2020, www.msme.gov.in)

1.2 Role of Technology in MSME Growth

IT (Information Technology) plays a key role in increasing organisational profitability. It also creates a sense of competitiveness, causing each company to consider their research and development roadmap in relation to the availability of the most recent technology. IT is a mechanism that enables MSMEs to efficiently respond to customer complaints and requirements by enabling information communication through various mediums such as emails, phone calls, and social media channels. Enterprises can use various IT service platforms for learning, marketing and advertising, selling their products and services, trading, and other purposes. Digitalization is increasing supply chain transparency and allowing MSMEs to significantly scale up their operations. New-age technologies have spawned new business models in the MSME sector over the last few decades. For instance, Brego, does real-time analysis of the company's financial data and provides insights; LenDenClub, helps meet lender’s need through

verified borrowers via its platforms; and Meesho, uses social media platform for small businesses to sell their products to customers. (*Govt. of India website for MSMEs, 2020*).

As mentioned earlier, it is projected that SMEs will contribute significantly to India's GDP in coming years. For it to happen a strong technology enabled ecosystem is required and one can see significant growth in technology start-up ecosystem of India and factors like policies, number of consumers, and available skilled resources are leading to further growth of the sector. India is home to about 7,000 and more technology start-up companies growing at the rate of 35 to 40% annually. Adoption of technology-based solutions like digital marketing and AI solutions will enhance customer base reachability and size. *(IBEF, 2021),* (*Govt. of India website for MSMEs, 2020*).

E-commerce giants are also providing technological solutions and assistance to MSMEs ,for example, Samarth Programme launched by Flipkart is to onboard different MSMEs onto e-commerce, and series of workshops are conducted for MSMEs in partnership with the FICCI. (*Economic Times, n.d.).* On similar lines, Amazon launched 'Digital Kendras' to educate MSMEs on the signification of technology adoption for their operations (*Business Standard, 2021*). Amazon helped approx. 25 Indian SMEs to onboard on its Digital services to expand in the Indian market. Dell is also contributing as technology advisors to MSME challenges. They also held an annual 'MSMEs Day' on its platform. Walmart and Google, have also decided to not stay behind but support the India's MSMEs in their journey. *(IBEF, 2021).*

MSMEs are now leveraging new-edge technology solutions like AI, ML, IoT, AR etc. by using them in their operations in order to realize their full potential (*IBEF, 2021*). Many technology companies tailor the technology solutions for MSMEs to improve their efficiency and profits. More solutions like, Google Advantage, Google My Business etc. cater specifically to MSMEs sector in India.

1.3 Technology Adoption Stages

Stages of Digital Transformation

According to Schallmo et. al. (*2018*) the three stages of Digital Transformation (DT) can be defined as under:

Digitization - "we define digitization as digitally enabling analog or physical artifacts for the purpose of implementing into said artifacts into business processes with the ultimate aim of acquiring newly

formed knowledge and creating new value for the stakeholders."

Digitalization - "we define digitalization as fundamental changes made to business operations and business models based on newly acquired knowledge gained via value-added digitization initiatives."

Digital Transformation - "we define digital transformation as a sustainable, company-level transformation via revised or newly created business operations and business models achieved through value-added digitization initiatives, ultimately resulting in improved profitability."

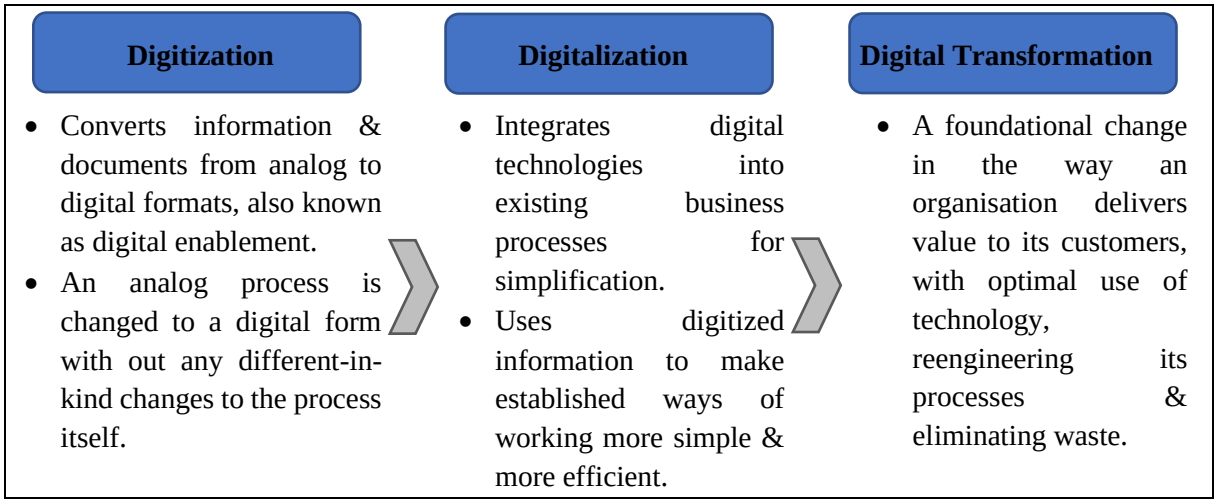
Digitization
Converts information & documents from analog to digital formats, also known as digital enablement.
An analog process is changed to a digital form with out any different-in-kind changes to the process itself.
Digitalization
Integrates digital technologies into existing business processes for simplification.
Uses digitized information to make established ways of working more simple & more efficient.
Digital Transformation
A foundational change in the way an organisation delivers value to its customers, with optimal use of technology, reengineering its processes & eliminating waste.

Figure 2: Three Stages of Digital Transformation
(Source: Researcher's construct)

1.4 Challenges

Following are some of challenges which MSMEs are facing while adopting new technology in their business (*Industrial Automation Magazine, 2021*).

- MSME lack knowledge about digital solutions that are right fir for their respective organizations, which can be adopted with minimal change within the organization.
- MSMEs face challenges in technology adoption and digital transformation as they have limited resources like capital etc.
- MSMEs hesitate to adopt as they fear that they cannot keep the pace with the ever cutting-edge technologies.
- MSMEs face challenge as they struggle to work with digitized data to make business decisions.
- Last but not the least, the most important challenge is the security of the system which also requires additional cost. Cybersecurity is also a great hindrance to the adoption of digital technology and not just for small players but even for large corporates.

Today's consumers expect high quality and faster turnaround time. It is highly unlikely to cater to these customers with mere manual processes. As a result, digital transformation of business becomes inevitable and key game changer. With effective use of technology, any job, large or small, becomes simple to complete. Furthermore, when organisations have the right data available at the right time, the decision-making, becomes more effective. To thrive today, an MSME must embrace digitalization wholeheartedly. With the MSMEs sector in India looking very promising in the present and future, MSMEs are expected to adopt more and more tech-based solutions to accelerate their growth rate realising their full potential. The business models of Indian MSMEs is evolving as the use of technologies like data science, robotics, IoT, artificial intelligence (AI), blockchain, cloud computing etc. has increased. Enterprises that have been digitally transformed have the potential to be future leaders (*Financial Express, 2020*).

1.5 Agra MSME Sector

Agra city enjoys the status of an International city and because of Taj Mahal Agra is developed as tourist centre. Apart from that it is also centre for many MSME industries like Shoe Industry, Handicraft (Agra is also known as the Handicraft City), Food Industry etc. Since the city is under constant monitoring by Hon'ble Supreme court for controlling pollution level. An area known as Taj Trapezium Zone was made to check the pollution level around Taj Mahal. Hence Pollution free Industry are promoted in the city.

The One District One Product (ODOP) initiative also a flagship project aims to promote homegrown and specialised items was launched in Uttar Pradesh by Department of MSME to showcase its traditional products. Detailed action plans were rolled out a to promote 57 unique products across the state's 75 districts, with the goal of doubling ODOP output within the next five years, based on clearly defined goals and a comprehensive examination of the state's export potential (*ODOP UP, 2020*).

"The ancient and nutritious 'Kala namak' rice, the rare and intriguing wheat-stalk craft, world-famous chikankari and zari-zardozi work on clothes, and the intricate and stunning horn and bone work that uses the remains of dead animals rather than live ones, a nature-friendly replacement for ivory, are all found in UP. Many of these products are GI-tagged, which means they have been certified as being

unique to that region of Uttar Pradesh. Many of these were also dying community traditions that are being resurrected through modernization and public awareness "(*ODOP UP, 2020*).

Agra District Products as listed by GoI are as follows :

Major Industries: "Leather Products and Shoes, Electrical Goods, Pipes, Packing Material, Rubber and Plastic"

Small Industries: "Leather Products, Cotton and Textile, Paper Products & Stationery, Auto and Engine Parts, C.I. Casting, Engineering, Chemical and Other Chemical Product, Food Product, Stone and Other Handicraft Items, Hosiery and Garments, Metal Products, Oil Mill, Diesel Engine, Zari Zardoji Handicrafts, Carpet and Duri Industry."

Smart technology use, e-marketplace deployment, and digitalization of manufacturing processes have provided this sector with the tools it needs to scale up growth. Government Of India too has taken an array of measures in this regard. These include:

- India's MSME ministry has outlined a plan to digitise the overall administration system in order to make it more effective, secure, and result-oriented. The MSME ministry has made significant investments, including INR 200 crores for the establishment of 20 technology facilities and INR 20 crores for the establishment of 100 extension centres (Corp Biz, 2022).
- GOI schemes such as 'Aatma Nirbhar Bharat' have provided a significant boost to home-grown industries through a variety of measures such as subsidies, incentives, and fiscal aid. The ultimate goal is to increase the manufacturing and export potential of these domestic firms, putting them at the centre of global supply chains (Corp Biz, 2022).
- To provide solutions to MSME's problems govt launched E-commerce portal 'Bharat Craft' where buyers and sellers can interact directly. *(Entrepreneur, n.d.)*.

The MSME sector is experiencing growth with increased internet penetration and widespread adoption of smart phones, which has further fuelled consumers' preference for digital payments supported by B2C e-commerce players. MSMEs are also forming strategic alliances with Fintech start-ups to provide consumers with hassle-free financing. From assisting *Kirana* stores to delivering groceries to facilitating the development and launch of e-stores, these start-ups provide a wide range of digital services while easing MSMEs' digital transformation (*Financial Express, 2020*).

The Indian MSME sector is significant contributor to Indian economy and provides huge opportunity to growth. The Indian footwear industry is a major contributor to this MSME sector. Digital Transformation is pervading all industries and sectors, including the Agra Shoe Industry. Digital Transformation, which by definition leverages technology in novel ways, has enormous potential for these MSMEs to disrupt the traditional ways in which they conduct business. Businesses benefit from this process; however, it is not uncommon for these digital transformations to cause pain for the business and society as a whole.

a. Therefore, a careful analysis of the pros and cons, a thoughtful ring-fencing of emerging risks, closer study on pilot basis before scaling up, fine-tuning based on feedback, etc., are required before MSMEs proceed with digital transformation.

b. As the MSMEs traverse this new digital road they will face a stiff uphill learning curve characterized with numerous pitfalls. It is only thus imperative for the novice MSME to be aware of emerging risks on the digital path and ensure enough mitigations & controls are in place to avoid set-backs and hiccups.

1.5.1 The Indian Footwear Industry

The leather industry significantly contributes to India's export-oriented growth and hence is a key contributor to the Indian economy. This sector is the nation's 6th largest foreign exchange earner, accounting for approximately 4 to 5% of total *exports (News on Air, 2021)*. Within the Indian leather industry, the top job creators is the footwear industry and hence one of the important segments. India is one of the top shoe manufacturers in the world, with 95% of demand and consumption coming from the domestic market. The shoe manufacturing industry is India's largest consumer of leather production. In India, the footwear industry has two segments: leather and non-leather, both progressing well in healthy domestic market. Globally the non-leather footwear is 86% of total global footwear consumption, following the trend industry in India too has enormous growth potential in near future. *(News on Air, 2021).* In India, the unorganised sector including MSME accounts for approximately 75% of non-leather footwear production. Major footwear production centres in the India are: “Agra, Chennai, Ranipet, Ambur, Mumbai, Kanpur, Jalandhar, Ludhiana, Delhi, Karnal, Sonepat, Faridabad, Pune, Kolkata, Calicut, and Ernakulam” (*Nicholas Shoes, 2021)*. Every day, India produces over

600,000 pairs of shoes. Uttar Pradesh's Agra and Kanpur, Tamil Nadu's Ranipet, Vaniyambadi, and Ambur, and parts of the National Capital Region all claim to be India's largest footwear manufacturing hub. There are currently 1.1 million people employed in India's shoe manufacturing industry (*Nicholas Shoes, 2021)*.

Research Dive *(May, 2021)* predicted that the global footwear market trends is expected to grow at a CAGR of 12.83% from 2021 to 2028.

Invest India's 2020 report on the "non-leather footwear Industry in India", suggests that by 2030 India's footwear production will increase 8 folds. *(Indian Retailer, 2020)*. The footwear industry in India is expected to grow at an 11% annual rate for next 5 years. The non-leather footwear industry in India is expected to exceed INR 600 Crores by 2024. India is the world's 2nd largest producer of footwear, which shows the world that India has immense opportunities in the footwear sector (*Invest India, n.d.*). According to World Integrated Trade Solution (WITS), India is also a major exporter of footwear exporting to the USA, the UK, France, Germany and China. In 2018, India exported 26.2 crore pairs of footwear, making it the world's 6th largest exporter of footwear (*WITS, n.d.)*. The footwear industry is one of the most labour-intensive industries in the country employing approx. 20 lakhs people. According to a DPIIT report, each Rs 1 crore investment can generate 250 jobs (*Indian Retailer, 2020*). Furthermore, the sector has the potential to generate 425 jobs for every 1,000 pairs produced and sold in India each day.

Agra – The HUB of Indian Footwear Industry

The Agra Shoe Industry enjoys the status of being one of the ODOP choice for Agra district.Agra is India's largest footwear manufacturing hub for leather shoes, accounting for approximately 65% of total domestic demand and accounting for 28% of total footwear export. Agra's total shoe business is worth more than $100 million per year. In Agra alone, there are 3.5 lakh people employed in the footwear manufacturing industry, which produces over 200,000 pairs of footwear daily in over 10,000 shoe manufacturing units (*Nicholas Shoes, 2020)*. Since the Mughal era, Agra has been one of the world's leading shoe manufacturers. Shoes were made from leather mushaks, which were used to transport Hing during Mughal rule. Agra is known throughout the world not only for the beauty of the

Taj Mahal, but also for the production of finely crafted footwear, and is considered Asia's largest footwear market (*Nicholas Shoes, 2020)*.

The footwear industry in Agra is a traditional, generational, and primary industry in this historic city. Almost 60% of the population is dependent on the footwear trade, primarily in hand-made cottage footwear (*Filming Indo, n.d.)*. Customers have a lot of options in the Agra footwear market. Agra leather manufacturing offers a diverse selection of leather boots, upper accessories, and other boot accessories. Moccasins, Derby, Traditional Gloves, Sandals, and other footwear for men, women, and children are made from sheep, buffalo, and goat leathers. The primary footwear importing countries from Agra are the USA, Canada, UK, Russia, Germany, Spain, France, Italy, Netherlands and South Africa, among others (*Filming Indo, n.d.)*.

Acknowledging the ability of Agra footwear industry, Govt. of India founded several institutions namely:

- "State Trading Corporation (STC)"
- "Council for Leather Export (CLE)"
- "Government Leather Institute (GLI)"
- "P. State Leather Development Marketing Corporation Ltd. (LAMCO)."
- "Khadi & Village Industries (KVI)"
- "Bharat Leather Corporation (BLC)"
- "Central Footwear Training Centre (CFTC)"

These have become leading institutes supporting the shoe industry by preparing skilled labour. In these institutes students learn the art of shoe making, technical aptitude, cutting-edge technology and get in-depth design knowledge. (*Filming Indo, n.d.)*.

Composition of Agra Footwear Industry is as follows:

Table 1: MSME Sector Distribution in Agra (Footwear Manufacturers)

(I)Footwear Manufacturers:			
Type of Units	**Total Numbers of Units**	**Total Number of Registered Units**	**Total Number of Exporters**
Structured Companies/Units	1000	1000	200
Unstructured	4200	2200	0

Companies/Units (cottage)			
Large Manufacturing Units	0	0	0
Medium Manufacturing Units	10	10	8
Small Manufacturing Units	800	800	128
Micro Manufacturing Units	190	148	64

(Source: Interaction with Cluster Development Officer, MSME-DI, Ministry of MSME, GoI)

Table 2: MSME Sector Distribution in Agra (Component Manufacturers)

(II) Component Manufacturers:			
Type of Units	**Total Numbers of Units**	**Total Number of Registered Units**	**Total Number of Exporters**
Structured Companies/Units	250	150	3
Unstructured Companies/Units	100	0	0
Large Manufacturing Units	0	0	0
Medium Manufacturing Units	1	1	1
Small Manufacturing Units	2	2	2
Micro Manufacturing Units	247	147	0

(Source: Interaction with Cluster Development Officer, MSME-DI,Ministry of MSME, GoI)

Table 3: MSME Sector Distribution in Agra (Traders – Footwear & Components)

(III) Traders (Footwear & Components):			
Type of Units	**Total Numbers of Trading Units**	**Total Number of Registered Trading Units**	**Total Number of Exporters Trading Units**
Structured Trading Units	9000	7000	0
Unstructured Trading Units	2000	2000	0
Medium Trading Units	2	0	0
Small Trading Units	0	0	0
Micro Trading Units	8998	6998	0

(Source: Interaction with Cluster Development Officer, MSME-DI, Ministry of MSME, GoI)

The Indian footwear industry has significant growth potential as the sector is no longer licenced or reserved and supporting ecosystem is being built like government forming supporting investment

policies, 100% FDI. Also, with advanced technologies and machines, innovation, the availability of skilled resources, advancement of e-commerce, and evolving buyer habits, the footwear industry has bright future. Initiatives such as Make in India, Start-up and many more are fuelling further expansion and growth *(Unicommerce, 2022)*. Global demand for footwear has seen a rise due to many factors particularly as a result of the COVID-19 pandemic like changing lifestyles, increased health awareness ,growing economies etc. Footwear industry's scope has also increased due the demand for fashionable, trendy, athletic, and sports shoes leading to development and growth of the sector. According to Statista (2022), a global leader in market and consumer data, the Indian footwear market is expected to grow at a 13.53% annual rate (CAGR 2022-2025) *(Unicommerce, 2022).*

The changing trends of the Indian fashion market has also influenced the Indian footwear industry. Because of rising demand, the e-commerce model has infiltrated the Indian footwear industry, creating numerous opportunities for the MSME sector, particularly in tier II and III cities *(Unicommerce, 2022)*.

2.0 Literature Review

2.1 Literature Review Map

Figure 2.1 presents the approach adopted to categorize the Literature Review conducted for this study. Papers, articles, web sources, etc. were reviewed to derive the context of Indian MSME sector, Digital Transformation in Industry especially in the MSME sector and noting of emerging risks during the MSME digital journeys. Each source was catalogued basis its Research Aim/Significance, Context, Research Methodology, Keywords, Findings/Conclusion, Future work, and Limitations.

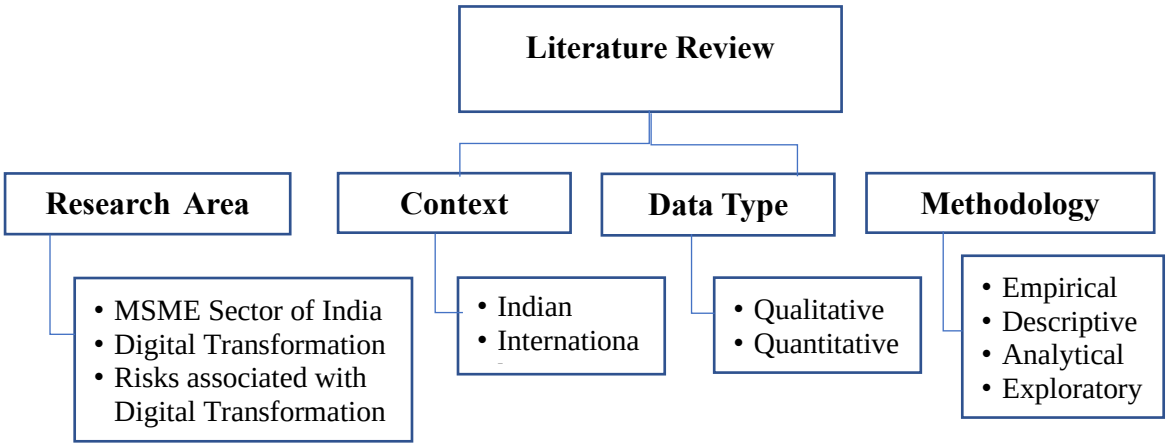

Figure 3: Literature Review
(Source: Researcher's Construct)

2.2 Conceptual Coverage of Literature

A review of literature was performed to understand the concepts of – Indian Micro, Small and Medium Enterprise (MSME) sector, Digital Transformation (DT) sweeping across the MSME sector, the associated emerging risk & challenges which DT is bringing to the MSME doorstep, and the control & mitigation framework needed to safeguard MSME on their digital journey. A summary of the literature reviewed under the given classification has been exhibited at the end of this section.

The Micro, Small and Medium Enterprise (MSME) sector is crucial and plays and will continue to play a key role in the Indian economy where there are major development challenges like unemployment and poverty. MSME sector too face many challenges which can be resolved if various stakeholders like the Government, Bank and Financial Institutions take interest and proper initiatives in the sector. (*Mehta, 2013*).

India possibly is in its full swing to experiment with digitalization. The more the consumers are adopting technology and becoming tech savvy more the Indian business enterprises are going digital. To take advantage of situation more and more new tech-based start-ups are coming up. MSME sector contribute 8% of total GDP, playing a pivotal role in the overall enhancement of financial system (*Sambrani & Jayadatta, 2018*).

In any business, well-founded strategy, organizational culture and leadership is key for successful Digital business transformation. 7 elements required for Digital business transformation are:" business model, organizational structure, digital skills of employees, digitization of business processes, IT infrastructure, digitization of products / services, digital channels for interaction with clients "(*Schwertner, 2017*).

Similar to the India MSME story, researchers in Bulgaria contacted Bulgarian SMEs within the DIGITRANS project "Digital Transformation in the Danube Region". The study shows that they have all realized significance and urgency of digitization of their business. For all firms, digitization and business model transformation are essential for creating a competitive edge and maintaining the competitiveness of the domestic and global market. (*Schwertner, 2017*).

During Covid-19 pandemic, entrepreneurs had got immense support from governments and supporting agencies as they developed innovative solutions to address social problems. Entrepreneurs in field of

Digital are crucial for transforming economy and in the process creating shared value for all. Innovative and disruptive digital technology will offer robust and affordable solutions to MSMEs in emerging markets, making them more competitive in the post Covid era. It is now evident that those businesses which imbibe digital technologies in their business model are contributing in recovering the economy swiftly. (*Sachin et. al., 2021*).

The speed of disruption brought in by technology is increasing rapidly and has been accelerated by COVID-19. MSMEs have to prepare for this disruption- they need to embed innovation in their organisation's culture involving their employees in the process. This has also been noticed in public entities as well. Key aspects of flexibility , cybersecurity and privacy in digital products and services are pivotal points for adoption. (*Almeida, Santos & Monteiro, 2020*).

MSMEs in general have survived economic downturns globally due to their inherent resilience. MSME owners are more agile in responding to the market changes despite their weaknesses in marketing, technology, etc. New tech solution adoption by MSMEs is generally still low as it may at pose risk to MSME in them becoming a target for Cyber frauds. Hence, most MSMEs depend on third party vendor for not only technology solutions but also to provide IT security measures for the solutions they provide (*Rahmawati, Yudhiyati, et. al., 2019*).

In recent times more and more MSMEs are being targeted with cyberattacks as they lack the know-how, risk perception of cybercrime and required skills for implementing holistic IT security solutions. Government and private bodies have issued guidelines and recommendations to encourage MSMEs in investing more into robust IT security systems. (*Huaman, Skarczinski et. al. , 2021*).

Globally research is being carried out on analytical frameworks w.r.t concerns relating to emerging cyber risks and the incorporation new technologies in MSME supply chain. These analytical frameworks usually identify a dynamic and self-learning SCS based on AI and ML for predicting cyber risks. These solutions also integrate a cognition engine and IoT that enables predictive cyber behaviour. Such a stack can enhance the capacity to assist in creating a comprehensive SWOT view for emerging cyber risk. (*Radanliev, Roure, et. al., 2020*).

Even with many known benefits of using digital technologies the level of confidence in adopting these technologies by MSMEs is low. Barriers to this adoption are hurdles such as poor internet connection,

difficulty in browsing and leveraging internet, and inadequate user training and support. MSMEs in India and Malaysia share a mutual concern of having low trust over the usage of internet and adoption of emerging technologies. (*Jahanshahi, Zhang, Brem, 2019*).

Table 4: Summary of Literature Review

Sr. No.	Title, Author, Publication	Research Area			Context		Data Type		Methodology			
		MSME sector	Digital Transformation	Risk associated with Digital Transformation	Indian	Foreign	Qualitative	Quantitative	Empirical	Descriptive	Analytical	Exploratory
1	"Strategy, not Technology, Drives Digital Transformation, By Gerald C. Kane, Doug Palmer, Anh Nguyen Phillips, David Kiron and Natasha Buckley, Deloite University Press 2015 (HBR)"		✔			✔	✔	✔		✔		
2	"Future developments in standardisation of cyber risk in the Internet of Things (IoT), Petar Radanliev, David C. De Roure, Jason R. C. Nurse, Rafael Mantilla Montalvo, Stacy Cannady, Omar Santos, La'Treall Maddox, Peter Burnap, Carsten Maple, The Authors 2020 (Springer)"			✔		✔	✔			✔		
3	"Cyber risk at the edge: current and future trends on cyber risk analytics and artificial intelligence in the industrial internet of things and industry 4.0 supply chains., Petar Radanliev, David De Roure, Kevin Page, Jason R. C. Nurse, Rafael Mantilla Montalvo, Omar Santos, La'Treall Maddox and Pete Burnap, Cybersecurity 2020 (Springer)"			✔		✔	✔			✔		

4	"Modus Operandi and Precautions to be taken against Fraudulent Transactions, RBI"			✓	✓		✓			✓		
5	"Cyber Security Solutions for Businesses in Financial Services: Challenges, Opportunities, and the Way Forward, Shahzeb Akhtar, Pratima Amol Sheorey, Sonali Bhattacharya, Ajith Kumar V. V, International Journal of Business Intelligence Research (Research Gate) 2021"			✓		✓	✓			✓		
6	"Small to Medium Enterprise Cyber Security Awareness: an initial survey of Western Australian Business , Craig Valli, Ian Martinus and Mike Johnstone, 2014 (Research Gate)"			✓		✓	✓					✓
7	"Has Covid-19 accelerated opportunities for digital entrepreneurship? An Indian perspective, Sachin Modgil, Yogesh K. Dwivedi b, Nripendra P. Rana, Shivam Gupta, Sachin Kamble Technological Forecasting & Social Change2021 (Science Direct)"	✓			✓		✓			✓		
8	"Cybersecurity: Risk management framework and investment cost analysis, In Lee, 2021 Kelley School of Business, Indiana University. Published by Elsevier Inc (Science Direct)"			✓		✓	✓			✓		

9	"Misinformation, disinformation, and fake news: Cyber risks to business, Pythagoras N. Petratos, 2021 Kelley School of Business, Indiana University. Published by Elsevier Inc (Science Direct)"			✓		✓	✓			✓		
10	"The good, the bad and the missing: A Narrative review of cyber-security implications for Australian small businesses, Tracy Tam, Asha Rao, Joanne Hall, Elsevier Inc - Computers and Security 2021 (Science Direct)"			✓		✓	✓			✓		
11	"Cyber Security Awareness, Knowledge and Behavior: A Comparative Study, Moti Zwilling, Galit Klien, Dušan Lesjak, Łukasz Wiechetek, Fatih Cetin & Hamdullah Nejat Basim, JOURNAL OF COMPUTER INFORMATION SYSTEMS (T&F)"			✓		✓		✓		✓		
12	"On market concentration and cybersecurity risk, Dan Geera, Eric Jardine b and Eireann Leverett , JOURNAL OF CYBER POLICY 2020(T&F)"			✓		✓	✓			✓		
13	"A practical road map for assessing cyber risk, Zeinab Amin, Journal of Risk Research 2017 (T&F)"			✓		✓	✓			✓		
14	"Cyber risk and the changing role of insurance, Mark Camillo, Journal of Cyber Policy 2017 (T&F)"			✓		✓	✓			✓		

15	"Small business digital transformation in the context of the pandemic, Munir Mandviwalla & Richard Flanagan, European Journal of Information Systems 2020 (T&F)"	✓	✓			✓	✓					✓
16	"MAKING BUSINESS SENSE OF TECHNOLOGY RISK, NORMAN D. MARKS, The EDP Audit, Control, and Security Newsletter 2021 (T&F)"			✓		✓	✓			✓		
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37	"E-commerce for SMEs: empirical insights from three countries, Asghar Afshar Jahanshahi and Stephen X. Zhang,Alexander Brem, Emerald 2019"	✓	✓			✓		✓		✓		
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47	"Digitalization and Industry 4.0 practices: An Explorative study on SMEs in India. Pratiksha Jha & Satish K Mittal. "	✔	✔		✔		✔			✔		
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** Detailed literature review in excel attached in Annexure.*

(Source: Researcher's Construct)

Researcher attempted to cover the research from the domains of Digital Transformation, Cyber risks & security, MSME sector. Around 43 published papers were from eminent journals were reviewed to gain deep understanding on the subject and the various factors important for this study. Of the papers reviewed nearly 75% of the papers were from international journals and sources, while 25% of the papers reviewed were from domestic journals and sources.

2.3 Pilot study

A pilot study was conducted to understand the landscape of Agra Footwear industry. The pilot study helped to provide a summarized view of the industry's key processes, the types of business models followed in this industry, some use cases on the usage of Technology in the industry. The pilot study also provided a sense on the level of risks exposure and certain basic issues which are faced by footwear firms, thereby necessitating a deep-dive study to carry out research, analysis of the findings and to bring forth data on this industry's Digital Transformation journey. For the study, following contacts from the footwear industry were approached to gather the above understanding:

Table 5: Footwear Companies covered during the Pilot Study

Sr No	Name of Company	Location	Company Contact
1	Eurosafety Footwear India Pvt Ltd.	Shashtripuram	Mr. Yash Agarwal
2	A.T. Exports	Amarpura	Mr. Rajat Vasan
3	Eego Italy	Gopal Pura	Mr. Harasatya Singh
4	Karam Udhyog	Nirbhay Nagar	Mr. R.K Tripathi
5	Global Footwear	Shashtripuram	MR. Amit Das

(Source: Researcher's construct)

2.4 Research gap

Current literature brings out following points relating to the Digital Transformation of MSME:

- There is a growing importance and focus on MSMEs in India because of their contribution to India GDP.
- A favourable government policy, advanced technology and growing financial aid are leading to MSME growth.
- Digital Transformation in MSME sector has commenced a decade ago but has accelerated recently due to pandemic.
- During adoption of Digital Transformation by MSMEs, many challenges are being faced by

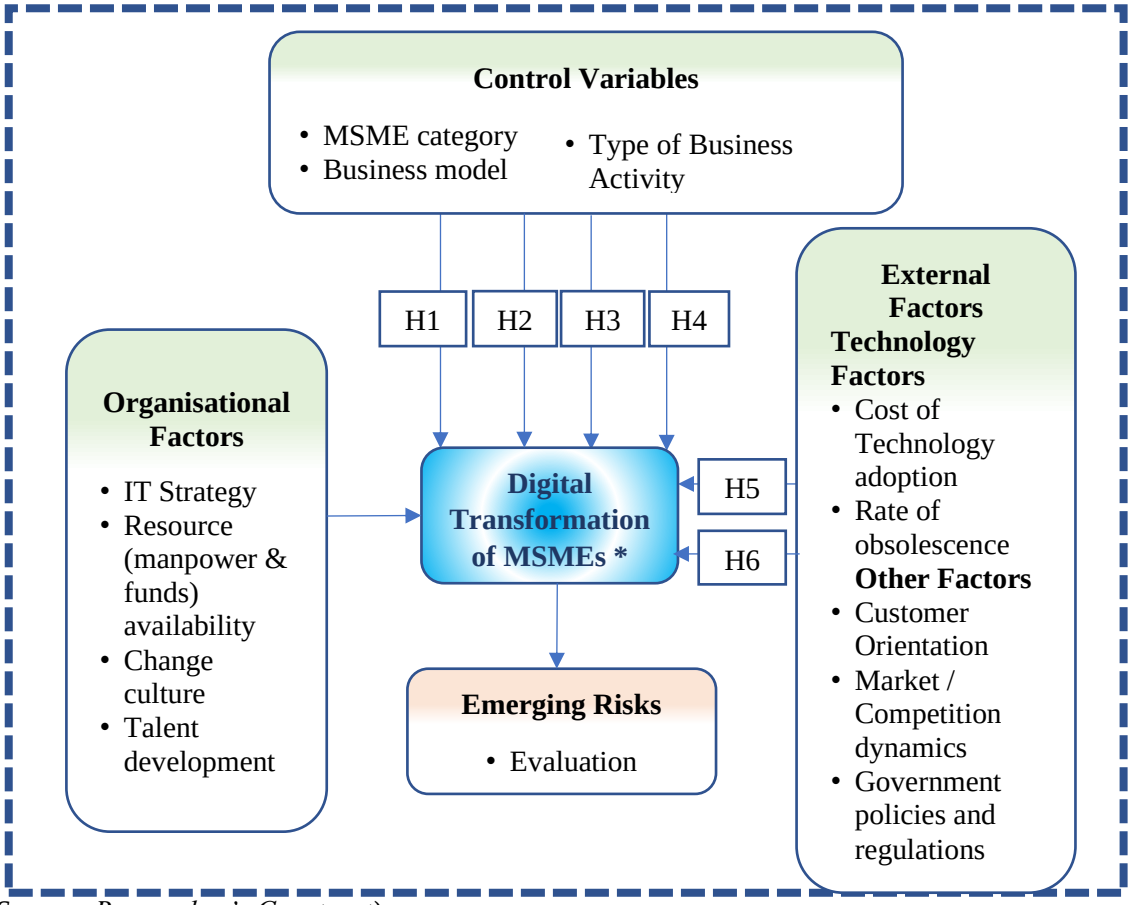
MSME.

- The business model of MSME is undergoing change due to Digital Transformation.

2.5 Need of the Study

- The MSME sector of the Agra lacks research because there is hardly any work published that considers the challenges faced during their journey towards digital transformation.
- When it comes to digital transformation, MSMEs takes one step forward but ten steps backward when a single risk event occurs. Therefore, risk mitigation should be a top focus as this industry continues on its path of digital transformation.
- A thorough investigation is required to comprehend the new risks in the MSME sector brought on by the digital transformation and to assess risk-mitigation measures.
- To prepare the MSME ecosystem for the future of business in the digital age, a framework for risk management must be introduced.

3.0 Conceptual Framework



(Source: Researcher's Construct)
** with special reference to Agra MSME sector*

Control Variables Definition:

- MSME Category – As per the classification by government 'Micro Enterprise", "Small Enterprise", "Medium Enterprise."
- Type of Business Activity – Footwear company can be a Component Manufacturer, Footwear Manufacturer or a Trader.
- Business Model – Footwear company may follow "Business to Business (B2B)", 'Business to Customer (B2C) model."
- Years of Existence – No. of years since incorporation of the company.

Technology factors :

- Cost of technology: It is the cost of technology implementation /maintenance.
- Rate of obsolescence of technology: It is the rate at which the technology become obsolete.

The focus of this study will be on the above-control variables of an organisation and their role in the digital transformation of MSME, as well as the emerging risks arising out of their digital transformation.

4.0 Research Objectives and Hypotheses

The study will adopt a special reference to Agra Shoe Industry (MSME sector) to base the findings. It is expected that the findings from the thesis could go a long way in proving to be a worthy reference for the MSMEs and will prod them to be wary of emerging risks & challenges, & be better prepared on their digital journey.

4.1 Research Objectives

In summary, the objectives of this study are thus:

1. To identify distinct stages of Digital Transformation in Agra MSME sector.
2. To evaluate the emerging risks & their impact due to Digital Transformation in Agra MSME sector.
3. To identify measures for dealing with emerging risks due to digital transformation in Agra MSME sector.

** The researcher's main focus in this study will be on MSMEs' use of technology in interactions with external stakeholders.*

4.2 Hypotheses

Following table captures the hypotheses. ANOVA (Analysis of Variance) technique will be used to investigate factors that are hypothesised or said to influence the dependent variables.

Table 6: Hypotheses and Tests to Verify Results

Hypotheses		Tests to be performed
H1	The category of MSME has no impact on the stage of Digital transformation	ANOVA
H2	Type of Business activity has no impact on the stage of Digital transformation	ANOVA
H3	Business model has no impact on the stage of Digital Transformation	ANOVA
H4	Years of existence has no impact on the stage of Digital Transformation	ANOVA
H5	Cost of technology has no impact on the stage of Digital Transformation	ANOVA
H6	Rate of obsolescence of technology has no impact on the stage of Digital Transformation	ANOVA

(Source: Researcher's Construct)

5.0 Research Methodology

Following principles of research methodology will be employed in this study.

5.1 Research Design

The study will follow Descriptive Research methodology, which includes surveys and fact-finding enquiries. "The purpose of Descriptive Research is description of state of affairs as it exists at present. In this method the researcher has no control over the variables and can only report what has happened or what is happening. The methods of research utilized in Descriptive Research are survey methods."

5.2 Sample Design

The following procedure will be adopted to select the sample for this study.

Population: Population under study is the MSME sector (structured) of Agra, of the industries listed on govt sites some of the key industries will be in scope i.e. Footwear, Packing Material, Diesel Engine, Handicraft (Marble items) industries.

Table 7: MSME Population (Agra)

MSME Population (Agra)	Total
	Approx. 47328
Structured	Approx. 17328
Unstructured	Approx. 30000

(Source: Government Of Uttar Pradesh website. https://agra.nic.in/economy)

Sample Frame and Units:

Frame: Agra City Structured MSME companies.

Units: Agra MSME industry – Medium, Small and Micro.

Type of Sampling:

Multilevel sampling will be used as follows :

- Cluster: Various MSME companies of Agra i.e. Footwear, Packing Material, Diesel Engine, Handicraft (Marble items) industries are selected for sampling.
- Strata – 3 Stratas i.e. Medium, Small, Micro are taken.
- Random sampling will be used to select members from each Strata.

Sample size:

To calculate the sample size for determining the Digital Stage of various footwear companies.

Step 1: Since the population is finite we will use

- Slovin's formula (*Slovin, E. (1960)*): n-N/(1+Ne2), where

  n=The sample size

  N=The population size (17,328 structured MSME of Agra)

  e=The margin of error (7%)

  As 95% confidence level is taken.

- Calculation:
  - n=17328/(1+17328*(0.07)2)=17328/86 = 201

Researcher wishes to consider Margin of Error as 7%. This amounts to a total sample size of 200.

50 from each cluster will be taken.

5.3 Data Collection and Analysis

Data collection details are as follows:

- **Primary data**: data will be collected to identify the status of Digital Transformation in Agra MSME Sector, and evaluate emerging risks due to Digital Transformation and their impact.
    - Type of Data: Quantitative.
    - Instrument: Survey questionnaire.
    - Scale: Interval Scale
- **Secondary data**:
    - Data will be collected from online Journals, Research reports, articles, and reports published by management consultants.
- **Data Analysis**
    - **Descriptive Statistics Tools**:
        - **ANOVA**: (Analysis of Variance) technique will be used to investigate factors that are hypothesised or said to influence the dependent variables. To find out if the relationship exists between variables.
        - **Z Test**: Testing of proportions will be used to determine the Digital Transformation Stages within each cluster of sampling unit.
        - **Confirmatory Factor Analysis (CFA)**: Test will be used to confirm if there is any relation between the identified factors and variables.
        - **Structural Equation Modelling (SEM)**: Test will be used to verify the contextual framework.
    - **Considerations**:
        - Software viz. SPSS, AMOS, will be used for data analysis.
        - Intergroup and intragroup analysis will be performed on MSME categories.
        - Force field analysis framework will be used for evaluating factors for and against Digital Transformation of MSMEs.
        - Methodological triangulation may be used to avoid research bias, enhance validity and to give a clearer picture.
- **Report**

Final report will be prepared and presented with the findings and recommendations.

6.0 Proposed Chapterization

The study will contain the following proposed chapters:

Chapter 1: Introduction

Chapter 2: Literature Review & Conceptual Framework

Chapter 3: Research Methodology

Chapter 4: Data Analysis

Chapter 5: Findings and Conclusion

References

7.0 References

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